Apple Server Diagnostics User Guide

For Version 3X106

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Contents

5 **Chapter 1: Overview and Requirements**
6 Overview of Server Diagnostics Configurations
9 Requirements
9 General Requirements
9 Storage Device Requirements
10 Local and Remote Requirements
11 NetBoot Server Requirements

12 **Chapter 2: Setup and Installation**
12 Setting Up a Storage Device for Server Diagnostics Installation
14 Installing Server Diagnostics EFI
15 Restoring Server Diagnostics EFI
16 Installing Server Diagnostics Mac OS X
18 Setting Up a NetBoot Server
20 Deleting the Server Diagnostics NetBoot Image

21 **Chapter 3: Starting Up Server Diagnostics**
21 Changing the Startup Disk
22 Changing the Startup Disk in System Preferences
22 Changing the Startup Disk Using the Command-Line Interface
23 Changing the Startup Disk Using Apple Remote Desktop
23 Changing the Startup Disk Temporarily at Startup
24 Starting Up a Server Diagnostics EFI NetBoot Image Using the Xserve Front Panel
26 Disabling the Firmware Password
27 Starting Up Mac OS X Server in 32-Bit Mode
27 Configuring Mac OS X Server to Start Up in 32-Bit Mode
28 Temporarily Starting Up Mac OS X Server in 32-Bit Mode

29 **Chapter 4: Using Server Diagnostics**
29 Setting Server Diagnostics to Host, Client, or Local Mode
30 Remotely Testing a Client Server
31 Testing the Local Server Using Server Diagnostics EFI
32 Testing the Local Server Using Server Diagnostics Mac OS X
32 Using Server Diagnostics EFI

33 Customizing Server Diagnostics EFI Test Settings
34 Clearing the Test Log
34 Viewing the Hardware Profile
35 Shutting Down or Restarting the Server
35 Viewing Saved Logs
35 Taking Screenshots
36 Using Server Diagnostics Mac OS X
36 Customizing Server Diagnostics Mac OS X Test Settings
37 Working with Test Groups
38 Viewing Logs
39 Setting Log Preferences
41 Shutting Down or Restarting the Server
41 Quitting Server Diagnostics Mac OS X While a Test is Running

42 Appendix: Server Diagnostics Test Reference
42 Comparison of Available Tests
44 Server Diagnostics EFI Tests
44 Startup Tests
44 AirPort Tests
45 Boot ROM Tests
45 Ethernet Controller Tests
45 Hard Drive Tests
45 Memory Tests
48 Power Supply Tests
48 Processor Tests
49 Sensor Tests
49 SMC PID Sensor Tests
49 USB Tests
49 Video Controller Tests
50 Server Diagnostics Mac OS X Tests
50 Startup Tests
50 AirPort Tests
51 Bluetooth Tests
51 Ethernet Controller Tests
52 Fan Tests
52 Hard Drive Tests
52 Memory Tests
53 Power Supply Tests
53 Sensor Tests
53 USB Tests
54 Video Controller Tests

Overview and Requirements

1

Apple Server Diagnostics tests your server for hardware issues.

Apple Server Diagnostics, also referred to as *Server Diagnostics*, runs a customizable set of tests to help you diagnose issues with the following components:

- AirPort
- Bluetooth®
- Boot ROM
- Ethernet controller
- Fan
- Hard drive
- Memory
- Power supply
- Processor
- Sensor
- USB ports
- Video controller

You can run Apple Server Diagnostics in Extensible Firmware Interface (EFI), which is referred to as *Server Diagnostics EFI,* or in Mac OS X or Mac OS X Server, which is referred to as *Server Diagnostics Mac OS X*.

By running Server Diagnostics EFI, you can diagnose hardware issues that prevent Mac OS X Server from successfully starting up. You can also run tests without interference from Mac OS X Server, and test more than 2.5 gigabytes (GB) of memory. However, Server Diagnostics Mac OS X provides an enhanced interface and has more extensive sensor, hard drive, and video controller tests. For a comparison and description of all available tests, see "Server Diagnostics Test Reference" on page 42.

You can test the server by running Server Diagnostics directly on the server. You can also run Server Diagnostics remotely on a computer with a network connection to the server.

Note: This guide describes how to use Apple Server Diagnostics version 3X106, which is included on the *Admin Tools* disc (Mac OS X Server version 10.6 or later).

Overview of Server Diagnostics Configurations

You can install and run Server Diagnostics in a variety of ways, so choose the method that best suits your needs. There are several options, each with advantages and disadvantages:

Option	Considerations
Use the preinstalled Server Diagnostics EFI	Advantages: • You can use Server Diagnostics EFI • You don't need a portable storage device • Server Diagnostics EFI typically loads faster than any other method • No installation is necessary Disadvantages: • Requires a server with Mac OS X Server 10.6 or later preinstalled • You need physical access to the server • Damage to the startup volume may prevent access to Server Diagnostics EFI • You can't save logs or screenshots locally • You must restore Server Diagnostics if you erase the volume it's installed on
Install Server Diagnostics EFI on a portable storage device	Advantages: • You can use Server Diagnostics EFI • You can use the same portable storage device to test multiple servers • You can save logs and screenshots locally Disadvantages: • You need physical access to the server • You need a volume on the portable storage device that has 30 MB free and that doesn't have Mac OS X or Mac OS X Server installed • The portable storage device must be physically connected to the server
Install Server Diagnostics EFI on the hard disk	Advantages: • You can use Server Diagnostics EFI • You don't need a portable storage device • You can save logs and screenshots locally Disadvantages: • You need physical access to the server • You need a volume on the server that has 30 MB free and doesn't have Mac OS X or Mac OS X Server installed

Option	Considerations
Host a NetBoot server	Advantages: • You can use Server Diagnostics EFI • You don't need to install Server Diagnostics on an internal volume on the server or on a portable storage device • You can use a single Server Diagnostics install image to test multiple servers • If you're testing an Xserve and have access to its front panel, you can start up Server Diagnostics without an input device connected to the Xserve Disadvantages: • You need physical access to the server • You need a server to host NetBoot service and the Server Diagnostics install image • The server must be on the same subnet as the NetBoot server • You can't save logs or screenshots locally
Start up the Server Diagnostics EFI located on the *Admin Tools* disc	Advantages: • You can use Server Diagnostics EFI • You can use the same disc to test multiple servers Disadvantages: (if your server has an optical drive) • You need physical access to the server • You must insert the disc in the server • You can't save logs or take screenshots Disadvantages: (if your server doesn't have an optical drive) • You need a computer with an optical drive and remote access to the server • You can't save logs locally
Install Server Diagnostics Mac OS X on a portable storage device	Advantages: • You can use Server Diagnostics Mac OS X • You can use a single portable storage device to test multiple servers Disadvantages: • You need an empty volume on the portable storage device with 10 GB free • You must install Mac OS X Server on the empty volume • The portable storage device must be physically connected to the server

Option	Considerations
Install Server Diagnostics Mac OS X on an internal volume	Advantages: • You can use Server Diagnostics Mac OS X • You don't need physical access to the server to run Server Diagnostics Mac OS X remotely (if you have Apple Remote Desktop) Disadvantages: • You need an empty volume on the server with 10 GB free • You must install Mac OS X Server on the empty volume

Requirements

Before you can run Server Diagnostics, you must meet general, storage device, and local and remote requirements.

General Requirements

To run Server Diagnostics, you need the following:

- An Intel-based Xserve or a Mac mini with Mac OS X Server version 10.6 or later installed
- The *Mac OS X Server Install DVD* and *Admin Tools* disc included with the Xserve or Mac mini (both discs should be version 10.6 or later)

Storage Device Requirements

Depending on whether you want to run Server Diagnostics EFI, Server Diagnostics Mac OS X, or both, you need empty volumes on the server or on a portable storage device.

If you want to run Server Diagnostics Mac OS X, the storage device must use the GUID Partition Table partition scheme. If you're running only Server Diagnostics EFI on the storage device, you don't need to use the GUID Partition Table partition scheme.

You can run both versions of Server Diagnostics by having two empty volumes on the same server or portable storage device. You need at least one of the following:

In order to	You need
Run Server Diagnostics EFI	A volume on the server that has at least 30 MB free, but doesn't have Mac OS X or Mac OS X Server installed
Run Server Diagnostics Mac OS X	An empty volume on the server with at least 10 GB free, which will be be used for a dedicated Mac OS X Server installation
Test multiple servers and run Server Diagnostics EFI	A USB 2.0 flash drive, or USB 2.0 or FireWire hard drive with a volume that has at least 30 MB free but doesn't have Mac OS X or Mac OS X Server installed
Test multiple servers and run Server Diagnostics Mac OS X	A USB 2.0 or FireWire hard drive that has an empty volume with at least 10 GB free

Local and Remote Requirements

To run Server Diagnostics locally on the server, you need to connect a keyboard, mouse, and display.

To run Server Diagnostics remotely, you need the following:

- A Macintosh computer with Mac OS X version 10.6 or later installed. This computer is referred to as the *host computer*.
- A server with Mac OS X Server version 10.6 or later installed. This server is referred to as the *client server*.
- A network connection with DHCP active or a direct Ethernet connection from the host computer to the client server.
- If the client server is going to run Server Diagnostics EFI and use a network connection, the network connection must use a built-in Ethernet port, and not an Ethernet adapter card.
- The client server must have Server Diagnostics installed either on an internal volume or on a connected portable storage device; or it must be able to run Server Diagnostics from a NetBoot server.
- The host computer must run Server Diagnostics Mac OS X. The client server can run Server Diagnostics EFI or Server Diagnostics Mac OS X.
- If the client server is running Server Diagnostics Mac OS X, you must be able to log in as the *root* account. The root account gives a system administrator complete access to the server.

NetBoot Server Requirements

To host Server Diagnostics EFI on a NetBoot server, your NetBoot server must:

- Have Mac OS X Server version 10.5 (10.5.8 or later recommended) installed.
- Be on the same subnet as the server being tested.
- Have 30 MB of hard disk space available for a Server Diagnostics NetBoot image.

Setup and Installation

2

Before you can run Server Diagnostics, you must set up your testing environment and install Server Diagnostics.

Make sure you meet Server Diagnostics requirements before attempting setup and installation. For information, see "Requirements" on page 9.

Server Diagnostics EFI is preinstalled on the server. The instructions in this chapter show you how to install Server Diagnostics in a different location or set up a NetBoot server.

Setting Up a Storage Device for Server Diagnostics Installation

To set up an internal volume or portable storage device for Server Diagnostics installation, you need at least 30 MB of available space for Server Diagnostics EFI or at least 10 GB of available space for Server Diagnostics Mac OS X, which requires installing Mac OS X Server. These requirements are described in detail in "Storage Device Requirements" on page 9.

If you're installing Server Diagnostics Mac OS X on one of the volumes, the storage device should use the GUID Partition Table partition map scheme. To view the storage device's partition map scheme, open Disk Utility and select the storage device. Make sure you select the storage device and not a volume within the storage device. At the bottom of the Disk Utility window, Partition Map Scheme should be GUID Partition Table.

If you want to repartition an in-use storage device, run Disk Utility from the *Mac OS X Server Install DVD* or run Disk Utility while your server is connected to another computer and is in target disk mode. Both of these methods erase the contents of your server's hard disk and require you to reinstall and reconfigure Mac OS X Server.

WARNING: The following instructions could erase all data on your storage device. Back up critical data before performing the following instructions.

To create and format empty storage device volumes:

1. Insert the *Mac OS X Server Install DVD*.
2. Open the Install Mac OS X Server application, click Restart, and authenticate if necessary.

   The computer restarts and opens the Mac OS X Server Installer.
3. Select a language and click Next (right-arrow).
4. Choose Utilities > Disk Utility.
5. Select the storage device that you want to set up.

   Make sure you select a storage device, and not volumes within the storage device. Volumes within a storage device are indented one level.
6. Click the Partition tab.
7. If the partition map scheme of the storage device isn't GUID Partition Table and you're going to install Server Diagnostics Mac OS X, choose something besides "Current" in the Volume Scheme pop-up menu, then click Options, select GUID Partition Table, and click OK.

   Changing the volume scheme erases all data on the storage device.
8. Review the partition sizes and adjust them to meet Server Diagnostics storage requirements.

To do this	Do this
Display a partition's size	Click the partition and review the Size field.
Set the size of the partition	Edit the Size field.
Create more partitions	Select a partition and click the Add (+) button.
Delete partitions	Select it and click the Delete (–) button.
Name a partition	Select it and enter a name in the Name field. Because this name is used when selecting which volume to start up Mac OS X from, choose a name that identifies the volume as being used for Server Diagnostics.

9. If you're installing Server Diagnostics EFI on a volume, select the volume and choose MS-DOS (FAT) from the Format pop-up menu.

   If you're installing Server Diagnostics Mac OS X on a volume, select the volume and choose Mac OS Extended (Journaled).
10. Click Partition.

11 Choose Disk Utility > Quit Disk Utility, and then choose Mac OS X Installer > Quit Mac OS X Installer.

After you finish setting up volumes, you can install Server Diagnostics EFI or Server Diagnostics Mac OS X. For information, see the following topics:

- "Installing Server Diagnostics EFI" on page 14
- "Installing Server Diagnostics Mac OS X" on page 16

Installing Server Diagnostics EFI

Before you install Server Diagnostics EFI, make sure that your storage device has a volume that has at least 30 MB available and is formatted as MS-DOS (FAT). The volume will be erased, so make sure all important data on the volume is backed up. For more information, see "Setting Up a Storage Device for Server Diagnostics Installation" on page 12.

To perform these instructions, you need the *Admin Tools* disc (version 10.6 or later) included with the server.

If you perform this task to install Server Diagnostics EFI on an internal volume on the server, you need administrator access to the server. If you perform this task to install Server Diagnostics EFI on a portable storage device, you can use any computer that you have administrator access to.

If you want to connect a host computer directly to the server, and the host computer doesn't provide DHCP service on the port used to directly connect to the server, you need to create a file on the server that assigns an IP address to the server. However, if the host computer provides DHCP service, don't create this file. For information about how to find out if a computer is providing DHCP service, see *Network Services Administration* at:

www.apple.com/server/macosx/resources

To install Server Diagnostics EFI:

1 If the server has an optical drive, insert the *Admin Tools* disc. If it doesn't have an optical drive, do the following:

   a Insert the *Admin Tools* disc in a computer with an optical drive.

   The computer must be on the same subnet as the server.

   b On the computer with the optical drive, open System Preferences and click Sharing. Select "DVD or CD Sharing."

c On the server, open a Finder window and select Remote Disc (under Devices on the left). Select the computer with the disc inserted. If the disc isn't listed, click "Ask to use." On the computer with the disc inserted, click Accept when a dialog appears asking if you want to give permission for your server to use your DVD drive.

After doing this, you can use the disc as if it's inserted in the server.

2 On the server, open AppleServerDiagnosticsEFI.pkg (located in /Diagnostics/ on the disc).

3 Follow the onscreen instructions, and at the Select Destination step, choose a volume that has at least 30 MB of space available and doesn't have Mac OS X Server installed.

4 If you're asked to authenticate, authenticate as a user with administrator privileges.

5 If you want to connect a host computer directly to the server and the host computer doesn't provide DHCP service on the port used to directly connect to the server, do the following:

a Open TextEdit (located in /Applications/).

b In a new file, enter an IP address that's not in use by the host computer. For example, enter:

123.123.123.123

If TextEdit doesn't open with a new blank file, choose File > New.

c Choose Format > Make Plain Text.

d Choose File > Save As.

e Name the file axd_set_ip_address, and then change the location of the file to the volume with Server Diagnostics EFI installed.

f Select "If no extension is provided, use '.txt'," and then click Save.

Restoring Server Diagnostics EFI

Server Diagnostics EFI is preinstalled on the startup volume of servers with Mac OS X Server (version 10.6 or later) installed. If you erase the startup volume, you'll erase Server Diagnostics EFI. If you install Server Diagnostics EFI instead of restoring it, you won't be able to start up Server Diagnostics EFI by holding down the D key at startup.

To restore Server Diagnostics EFI:

1 If the server has an optical drive, insert the *Admin Tools* disc. If it doesn't have an optical drive, do the following:

a Insert the *Admin Tools* disc in a computer with an optical drive.

The computer must be on the same subnet as the server.

b On the computer with the optical drive, open System Preferences and click Sharing. Select "DVD or CD Sharing."

c On the server, open a Finder window and select Remote Disc (under Devices on the left). Select the computer with the disc inserted. If the disc isn't listed, click "Ask to use." On the computer with the disc inserted, click Accept when a dialog appears asking if you want to give permission for your server to use your DVD drive.

After doing this, you can use the disc as if it's inserted in the server.

2 On the server, open AppleServerDiagnosticsHD.pkg (located in /Diagnostics/ on the disc).

3 Follow the onscreen instructions, and at the Select Destination step, choose a volume that has at least 30 MB of space available and doesn't have Mac OS X Server installed.

4 If you're asked to authenticate, authenticate as a user with administrator privileges.

Installing Server Diagnostics Mac OS X

Before you install Server Diagnostics Mac OS X, make sure that your storage device uses the GUID Partition Table partition scheme and that it has an empty volume with 10 GB of available space. For more information, see "Setting Up a Storage Device for Server Diagnostics Installation" on page 12.

If you perform this task to install Server Diagnostics Mac OS X on an internal volume on the server, you need administrator access to the server. If you perform this task to install Server Diagnostics Mac OS X on a portable storage device, you can use any computer that you have administrator access to.

Installing Server Diagnostics Mac OS X involves three steps:

- Install Mac OS X Server with minimal options selected
- Copy Server Diagnostics Mac OS X from the *Admin Tools* disc to /Applications/
- Configure Mac OS X Server

By dedicating a minimal installation of Mac OS X Server for use with Server Diagnostics Mac OS X, you reduce the risk of server processes interrupting Server Diagnostics testing.

To install Server Diagnostics Mac OS X:

1 If the server has an optical drive, insert the *Mac OS X Server Install DVD*, open the Install Mac OS X Server application, click Restart, and authenticate if necessary. If the server doesn't have an optical drive, do the following:

a Insert the *Mac OS X Server Install DVD* in a computer with an optical drive and has Mac OS X or Mac OS X Server version 10.5.2 or later installed.

The computer must be on the same subnet as the server.

b On the computer with the disc inserted, open Remote Install Mac OS X (located in /Applications/Utilities/).

c Continue through the Remote Install Mac OS X assistant, selecting the inserted disc and the network connection that's on the same subnet as the server.

d Restart the server and hold down the Option key while it restarts.

e When a list of startup disks appears, select Mac OS X Server Install Disc and click the arrow button.

If it isn't listed and you're connecting to the computer over AirPort, select the AirPort network in the pop-up menu under the startup disk list.

2 Continue through the Mac OS X Server Installer until you reach the step where you select the disk to install Mac OS X Server on.

3 Select a volume that's at least 10 GB.

If the volume isn't empty, choose Utilities > Disk Utility. Select the volume. In the Erase pane, click Erase. After the volume is erased, choose Disk Utility > Quit Disk Utility.

4 Click Customize, deselect all checkboxes, click OK, and then click Install.

When the Installer finishes installing Mac OS X Server, the computer restarts and the Mac OS X Server setup assistant opens.

5 Continue through the setup assistant and enter any information that's requested. In the Users and Groups step, select Configure Manually. Don't enable any services.

When you finish entering information in the setup assistant, the login window appears.

6 Log in with the user name "root" and the password of the user you created in the setup assistant.

You must set up and run Server Diagnostics Mac OS X as root. Otherwise, you won't be able to test the server you've installed Server Diagnostics Mac OS X on.

7 If the server has an optical drive, insert the *Admin Tools* disc. If it doesn't have an optical drive, do the following:

a Insert the *Admin Tools* disc in a computer with an optical drive.

The computer must be on the same subnet as the server.

b On the computer with the optical drive, open System Preferences and click Sharing. Select "DVD or CD Sharing."

c On the server, open a Finder window and select Remote Disc (under Devices on the left). Select the computer with the disc inserted. If the disc isn't listed, click "Ask to use." On the computer with the disc inserted, click Accept when a dialog appears asking if you want to give permission for your server to use your DVD drive.

After doing this, you can use the disc as if it's inserted in the server.

8 Open a Finder window and drag the AppleServerDiagnostics.app file from /Diagnostics/ on the *Admin Tools* disc to the /Applications/ folder on the server.

9 If you're setting up a client server, open a Finder window, select the /Applications/ folder, and choose New Folder from the Action (gear) pop-up menu. Name the folder AppleServerDiagnosticsClient.

Client servers are remotely controlled by host computers.

10 Open System Preferences (located in /Applications/). Change the following options in System Preferences panes.

System Preferences pane	Recommended configuration
Accounts	Select the System Administrator account, and click Login Items. Click Add (+), select AppleServerDiagnostics.app (typically located in /Applications/), and click Add.
CDs & DVDs	In all pop-up menus, choose Ignore.
Desktop & Screen Saver	In the Screen Saver pane, drag the "Start screen saver" slider to Never.
Energy Saver	In the Sleep pane, drag both sliders to Never, and deselect "Put hard disk(s) to sleep when possible."
Exposé and Spaces	In the Exposé pane, in all pop-up menus, choose "–." In the Spaces pane, deselect Enable Spaces.
Software Update	In the Scheduled Check pane, deselect "Check for updates."

If you can't change settings in System Preferences, click the lock button and authenticate.

After installing the Server Diagnostics Mac OS X, you must log in as root to run Server Diagnostics to test your own server. If you don't log in as root, Server Diagnostics Mac OS X enters host mode and waits for a connection to a client server to control.

Setting Up a NetBoot Server

Before you set up a NetBoot server, make sure you have an available server that meets the requirements described in "NetBoot Server Requirements" on page 11.

After you set up a NetBoot server, you install the Server Diagnostics NetBoot image. Because the Server Diagnostics NetBoot image is a special image, you can't use System Image Utility to delete the image.

For information about deleting the Server Diagnostics NetBoot image, see the next section, "Deleting the Server Diagnostics NetBoot Image."

To set up a NetBoot server:

1. Open Server Admin (located in /Applications/Server/).
2. If the server that will host NetBoot isn't listed, click the Add (+) button and choose Add Server. Enter the IP address of the server in the Address field, enter the user name and password of the server administrator in the User Name and Password fields, and then click Connect.
3. Click the disclosure triangle for the server that will host NetBoot.
4. If NetBoot isn't listed, select the server and click Settings. In the Services pane, select NetBoot and then click Save.
5. Select NetBoot, click Settings, and then click General.
6. In the "Enable NetBoot on at least one port" list, select the Enable checkboxes for the interfaces that you want to serve the Server Diagnostics NetBoot images over.

   If multiple network interfaces are listed, it's likely that only one of the interfaces is on the same subnet as your server. If you're not sure which interface is on the same subnet, open Network Utility (located in /Applications/Utilities/) on your NetBoot server and your server. In the Info pane, choose different network interfaces on the NetBoot server and your server and compare the IP Address fields. Usually, computers are on the same subnet if their IP addresses start with same numbers (for example, they may both start with 192.168.2).
7. In the volume list, select the Images checkbox and Client Data checkbox for the volume that will store the Server Diagnostics NetBoot image.

   The volume must have at least 30 MB free.
8. Click Save.
9. In a Finder window, navigate to the Diagnostics folder on the *Admin Tools* disc, and then open AppleServerDiagnosticsNetBoot.pkg.
10. Follow the onscreen instructions to install the Server Diagnostics NetBoot package.
11. In Server Admin, select NetBoot, and then click Images.
12. If the Server Diagnostics NetBoot image has the same index (listed in the Index column) as another image, deselect the Enable checkbox for the conflicting image.

    Don't change any of the default Server Diagnostics NetBoot image settings.
13. Click Start NetBoot.

Deleting the Server Diagnostics NetBoot Image

You can't use System Image Utility to delete the Server Diagnostics NetBoot image. Instead, you must delete the Server Diagnostics NetBoot image in the NetBoot image folder, which is located at:

/Volumes/*volumename*/Library/NetBoot/NetBootSP#

Replace *volumename* with the name of the volume that you're installing the Server Diagnostics NetBoot image onto. The number (#) varies depending on whether you're using several NetBoot volumes. If you're using only one NetBoot volume, the Server Diagnostics NetBoot image is located in NetBootSP0. If you're using several NetBoot volumes, the Server Diagnostics NetBoot image may be located in a different folder (for example, NetBootSP1, NetBootSP4, or NetBootSP11).

To delete the Server Diagnostics NetBoot image:

- Open a Finder window and delete AXD.nbi from the NetBoot image folder.

Starting Up Server Diagnostics 3

This chapter describes several methods that let you change the startup disk to the volume with Server Diagnostics installed.

Before you start up Server Diagnostics, make sure everything is properly installed and configured. For information, see Chapter 2, "Setup and Installation," on page 12.

Changing the Startup Disk

Server Diagnostics is usually installed on a dedicated volume to minimize the risk of server processes interrupting the tests. Because of this, you need to change the startup disk to the volume with Server Diagnostics installed before you can use the tools.

If you want to test a client server remotely, you first need to start up Server Diagnostics on the host computer, and then start up Server Diagnostics on the client server.

To start up Server Diagnostics, set the startup volume of the server to the volume or disk image containing Server Diagnostics. If Mac OS X Server starts up by default on your server, you can change the startup disk in the Startup Disk pane of System Preferences. Otherwise, you can temporarily change the startup disk by holding down a particular key while starting up the server:

Goal	Hold down this key at server startup
Choose the Server Diagnostics volume before starting up Mac OS X	Option
Start up the preinstalled Server Diagnostics EFI or start up Server Diagnostics EFI from the *Admin Tools CD* in the server's optical drive	D
Start up using the Server Diagnostics EFI disk image from a NetBoot server	F1 or a specific combination of Xserve front panel buttons

If you insert the *Admin Tools CD* in another computer and run Remote Install Mac OS X (located in /Applications/Utilities/ on the computer), you can hold down the Option key and choose the Administration Tools volume before starting up Mac OS X to run Server Diagnostics EFI from the disc.

The Startup Disk pane of System Preferences can start up Server Diagnostics Mac OS X, but not Server Diagnostics EFI. You can press the Option key at startup to start up either Server Diagnostics Mac OS X or Server Diagnostics EFI.

The server becomes unavailable whenever you use Server Diagnostics. Before starting tests, alert your users that the server will be unavailable.

Changing the Startup Disk in System Preferences

If Mac OS X Server starts up by default on your server, you can use System Preferences to change the startup disk. The list of startup volumes includes internal volumes and connected portable storage device volumes.

When you change the startup disk in System Preferences, you can't select a startup disk with Server Diagnostics EFI installed. To change the startup disk to the volume with Server Diagnostics EFI installed, change the startup disk at startup. For information, see "Changing the Startup Disk Temporarily at Startup" on page 23.

To change the startup disk in System Preferences:

1. Open System Preferences on the server, and then select Startup Disk.
2. If the lock icon is locked, click it, and then authenticate as a system administrator.
3. Select the startup disk with the Server Diagnostics and click Restart.

When you're done using Server Diagnostics, change the startup disk back to the volume you were using previously.

Changing the Startup Disk Using the Command-Line Interface

If Mac OS X Server starts up by default on your server, you can use the command-line interface to change its startup disk. You can use the command-line interface to start up from internal volumes and connected portable storage device volumes.

You can also change the startup disk of a remote server using the command-line interface. Remote login must be enabled on the remote server (enabled by default). You can enable remote login in the Sharing pane of System Preferences.

When you change the startup disk using the command-line interface, you can't select a startup disk with Server Diagnostics EFI installed. To change the startup disk to the volume with Server Diagnostics EFI installed, change the startup disk at startup. For more information, see "Changing the Startup Disk Temporarily at Startup" on page 23.

You need to be able to authenticate as the root account in order to change the startup disk using the command-line interface.

Note: The Terminal commands described in this task are case-sensitive, and must be entered as shown.

To change the startup disk using the command-line interface:

1. Open Terminal (located in /Applications/Utilities/).
2. If you want to connect to a remote server, enter the following in the Terminal window, and authenticate when requested:

   ```
   ssh username@serveraddress
   ```

   Replace *username* with the short name of a user who can authenticate as the root account on the server. Replace *serveraddress* with the URL, IP address, or host name of the server.
3. Enter the following, and then authenticate as the root account:

   ```
   sudo bless -folder "/Volumes/volumename/System/Library/CoreServices"
        -setBoot
   ```

   Replace *volumename* with the name of the volume you want to start up from.

   When you're done using Server Diagnostics, change the startup disk back to the volume you were using previously.

Changing the Startup Disk Using Apple Remote Desktop

If you have Apple Remote Desktop, you can change the startup disk of remote computers to an internal volume or connected portable storage device volume.

For information about using Apple Remote Desktop to set a computer's startup disk, see the *Apple Remote Desktop Administrator Guide*, located at:

www.apple.com/remotedesktop

Changing the Startup Disk Temporarily at Startup

If your server has trouble starting up Mac OS X Server or doesn't have Mac OS X Server installed, you can temporarily change the startup disk by holding down a key while the server is starting up. This method requires that you have a keyboard and mouse attached to the server and that you can restart the server.

If you don't have a keyboard and mouse attached to the server, use the instructions in the next section, "Starting Up a Server Diagnostics EFI NetBoot Image Using the Xserve Front Panel."

If a firmware password is set, you can't temporarily change the startup disk by holding down the D or F1 key. You can do it by holding down the Option key, but you must authenticate with the firmware password.

For information about disabling the firmware password, see "Disabling the Firmware Password" on page 26.

To temporarily change the startup disk at startup:

1. Restart the server.
2. While the server is restarting, hold down the Option key until a list of volumes appears. If you're asked to authenticate, enter the firmware password and click the Continue (right-arrow) button.

   If you haven't erased the preinstalled Mac OS X Server volume with Server Diagnostics EFI, you can start up Server Diagnostics EFI by holding down the D key instead of the Option key. If you erased the volume but you have the *Admin Tools* disc inserted, you can start up using Server Diagnostics EFI located on the disc by holding down the D key instead of the Option key.

   If you want to start up Server Diagnostics EFI from a NetBoot image hosted on a NetBoot server, hold down the F1 key instead of the Option key.

   Each of these alternatives immediately starts up Server Diagnostics EFI and bypasses the list of volumes described in the next step.
3. If you displayed the list of volumes instead of immediately starting up Server Diagnostics, select the volume with Server Diagnostics, and then click the arrow button to start up.

   The Server Diagnostics EFI volume is listed as EFI Boot. If you've inserted the *Admin Tools* disc in another computer with Mac OS X or Mac OS X Server version 10.5.2 or later installed and you run Remote Install Mac OS X, the Server Diagnostics EFI volume is listed as Administration Tools.

   After you finish using Server Diagnostics EFI and restart the server, it starts up from the default startup volume.

Starting Up a Server Diagnostics EFI NetBoot Image Using the Xserve Front Panel

You can use the Xserve front panel buttons to start up a Server Diagnostics EFI disk image hosted by a NetBoot server. This technique is useful for situations where your Xserve:

- Doesn't have a monitor or keyboard attached
- Doesn't respond to keyboard input
- Doesn't have Mac OS X Server installed

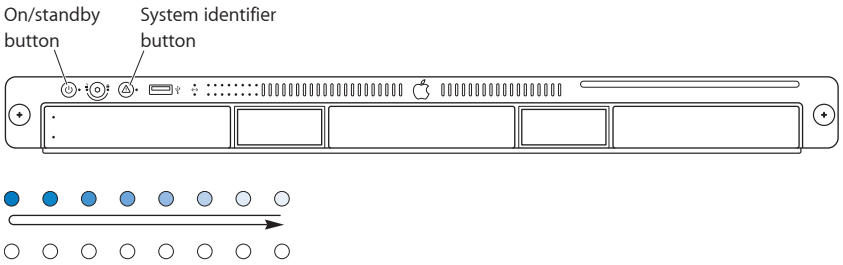
The Xserve must be on the same subnet as the NetBoot server hosting the Server Diagnostics EFI disk image.

If the Xserve EFI requires a password, you won't be able to start up a NetBoot image using the front panel. You need to disable the firmware password before you can use the front panel. To disable the password, you must be able to start up Mac OS X Server on the Xserve.

To use the Xserve front panel to start up a Server Diagnostics EFI NetBoot image:

1 Turn off the Xserve.

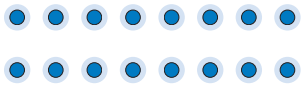
2 Hold down the system identifier button and press the on/standby button. Continue holding down the system identifier button until the top row of lights blink in sequence.



Top row of lights blink in sequence.

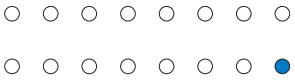
If the two rows of lights on the front panel blink once and the Xserve resumes its startup sequence, a firmware password is enabled and you need to disable the password.

For information about disabling the firmware password, see the next section, "Disabling the Firmware Password."



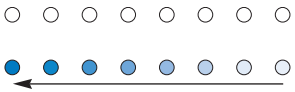
If both rows of lights blink once, disable the firmware password.

3 When you release the system identifier button, the lower-right light should turn on.



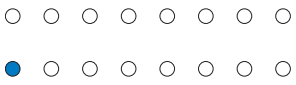
Lower-right light comes on.

4 Press the system identifier button again. The lights in the bottom row should now be advancing right to left.



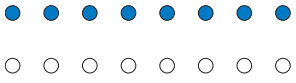
Bottom row of lights advances right to left.

5 Press the system identifier button repeatedly until the lower-left light turns on.



Lower-left light comes on.

6 While the lower-left light is on, press and hold the system identifier button until all the lights in the top row are on. Release the system identifier button.



Top row of lights comes on.

When you release the button, the Xserve starts up from the Server Diagnostics EFI NetBoot disk image.

After you run Server Diagnostics EFI and restart, the Xserve starts up from its default startup volume.

Disabling the Firmware Password

If a firmware password is enabled, you can't:

- Start up from a Server Diagnostics EFI NetBoot image using the Xserve front panel
- Temporarily change the startup volume by holding down the F1 or D key at startup

If a firmware password is enabled and you try to temporarily change the startup volume by holding down the Option key at startup, you must authenticate.

To disable the firmware password:

1 If the server has an optical drive, insert the *Mac OS X Server Install DVD*, open the Install Mac OS X Server application, click Restart, and authenticate if necessary. If the server doesn't have an optical drive, do the following:

a Insert the *Mac OS X Server Install DVD* in a computer with an optical drive and has Mac OS X or Mac OS X Server version 10.5.2 or later installed.

The computer must be on the same subnet as the server.

b On the computer with the disc inserted, open Remote Install Mac OS X (located in /Applications/Utilities/).

c Continue through the Remote Install Mac OS X assistant, selecting the inserted disc and the network connection that's on the same subnet as the server.

d Restart the server and hold down the Option key while it restarts.

e When a list of startup disks appears, select Mac OS X Server Install Disc and click the arrow button.

If it isn't listed and you're connecting to the computer over AirPort, select the AirPort network in the pop-up menu under the startup disk list.

2 After selecting a language, choose Utilities > Firmware Password Utility.

3 In Firmware Password Utility, click Change.

4 Deselect "Require password to change firmware settings," and click OK. Authenticate when asked.

5 Choose Firmware Password Utility > Quit Firmware Password Utility.

6 Choose Mac OS X Installer > Quit Mac OS X Installer. Click Startup Disk, select the startup disk with Mac OS X Server installed, and then click Restart.

Starting Up Mac OS X Server in 32-Bit Mode

Server Diagnostics Mac OS X requires that Mac OS X Server be running in 32-bit mode. By default, most Intel-based Xserve models run in 64-bit mode.

You should run Server Diagnostics Mac OS X on a dedicated volume so starting up in 32-bit mode won't affect users. If you use the volume for other purposes, consider temporarily starting up Mac OS X Server in 32-bit mode.

Configuring Mac OS X Server to Start Up in 32-Bit Mode

You can configure Mac OS X Server to start up in 32-bit mode by default. This affects Mac OS X Server installed on this volume, but not installations of Mac OS X or Mac OS X Server on other volumes.

Afterwards, you can later reconfigure Mac OS X Server to start up in 64-bit mode by default.

To configure Mac OS X Server to start up in 32-bit mode:

1 Open Server Diagnostics Mac OS X.

You should see a dialog asking you if you want to permanently configure Mac OS X Server to run in 32-bit mode. If it doesn't appear, Mac OS X Server is already running in 32-bit mode.

2 In the dialog that appears, click "Configure and Restart."

The server restarts in 32-bit mode and loads the volume with Server Diagnostics Mac OS X installed.

To reconfigure Mac OS X Server to start up in 64-bit mode:

1 On the Mac OS X Server volume that you want to start up in 64-bit mode, open Terminal (in /Utilities/).

2 Enter the following:

```
sudo systemsetup -setkernelbootarchitecture x86_64
```

If you're asked to authenticate, authenticate as a user with administrator privileges.

Temporarily Starting Up Mac OS X Server in 32-Bit Mode

You can override the default configuration and start up Mac OS X Server in 32-bit mode. The server reverts to 64-bit mode the next time you restart it.

To start up Mac OS X Server in 32-bit mode:

1 Use System Preferences to start up from the volume with Server Diagnostics Mac OS X installed.

For information, see "Changing the Startup Disk in System Preferences" on page 22.

2 While the computer is starting up, hold down the 3 and 2 keys.

Using Server Diagnostics

4

Server Diagnostics Mac OS X and Server Diagnostics EFI have different interfaces and functionality. This chapter describes how to use both sets of Server Diagnostics.

Before you can use Server Diagnostics, make sure you've properly started up the tools. For information, see Chapter 3, "Starting Up Server Diagnostics," on page 21.

Setting Server Diagnostics to Host, Client, or Local Mode

Server Diagnostics can start up in any of three modes, depending on whether:

- You're opening Server Diagnostics EFI or Server Diagnostics Mac OS X
- Any of the computers on the same subnet are host computers
- A host computer is directly connected
- You're logged in as root
- You're running Server Diagnostics Mac OS X on a computer that isn't a Intel-based Xserve or a Mac mini with Mac OS X Server installed

The following table describes the three modes:

Mode	Description	Automatically enters mode if
Host	The computer searches for servers that are on the same subnet and start Server Diagnostics in remote mode. When one is found, the host computer controls Server Diagnostics on the client server.	You run Server Diagnostics Mac OS X and either: • The computer isn't an Intel-based Xserve or a Mac mini with Mac OS X Server installed • You're not logged in as root
Client	The server can be controlled by a host computer.	You're running Server Diagnostics EFI and a host computer is on the same subnet or is directly connected.
Local	The server runs all tests locally.	You're running Server Diagnostics EFI and a host computer isn't on the same subnet and isn't directly connected.

If you're logged in as root on the server, and then you run Server Diagnostics Mac OS X, you can choose which mode to enter.

Remotely Testing a Client Server

If you want to test a client server, you must first start up Server Diagnostics on the host computer, set it to connect to the client server, and then start up the Server Diagnostics on the client server and set it to be a client of the host computer.

The host computer must run Server Diagnostics Mac OS X. The client server can run Server Diagnostics Mac OS X or Server Diagnostics EFI. The available tests are based on which Server Diagnostics the client server is running.

When you start up Server Diagnostics EFI, the server first looks for a host computer. If it finds a host computer, the server enters client mode. If it doesn't find a host computer, the server enters local mode.

When you start up Server Diagnostics Mac OS X, the server automatically becomes a host computer if either of the following are true:

- You logged in to Mac OS X with an account that isn't root.
- You're running Server Diagnostics Mac OS X on a computer that isn't an Intel-based Xserve or a Mac mini with Mac OS X Server installed.

If Server Diagnostics Mac OS X doesn't automatically become a host computer, it asks if it should connect to a client server, be a client of a host computer, or run tests locally.

To remotely test a client server:

1. On the host computer, open Server Diagnostics Mac OS X (typically located in /Applications/).
2. If the host computer is an Intel-based Xserve or a Mac mini with Mac OS X Server installed and you're logged in as root, when Server Diagnostics Mac OS X opens, a dialog asks you to choose which mode to enter. Choose "Connect to remote server" and click OK.

   If your computer isn't an Intel-based Xserve or a Mac mini with Mac OS X Server installed, the dialog doesn't appear, and Server Diagnostics Mac OS X automatically enters host mode.
3. On the client server, change the startup disk to a volume with Server Diagnostics and restart it.

   You can also temporarily change the startup disk to either a volume with Server Diagnostics on it or to a Server Diagnostics NetBoot disk image when you start up the server.

   For information about how to change or temporarily change the startup volume, see Chapter 3, "Starting Up Server Diagnostics," on page 21.
4. If you're starting up Server Diagnostics Mac OS X, log in as root. If Server Diagnostics Mac OS X doesn't open automatically, open the Apple Server Diagnostics application (typically located in /Applications/). Choose "Client of a remote host," and then click OK.
5. If you're starting up Server Diagnostics EFI, the server automatically enters client mode.

   There are several ways to determine whether the host computer and client server have established a successful connection:

   - The IP address field in the Server Diagnostics window on the host computer should match the IP address assigned to the client server.
   - The name of the Server Diagnostics window on the host computer is "Apple Server Diagnostics remote log," not "Apple Server Diagnostics local log."
   - The log area of the client server uses more of the Server Diagnostics window. Shut Down, Restart, and a few other buttons are removed.

Testing the Local Server Using Server Diagnostics EFI

To test the local server, make sure none of the computers on the same subnet as the server is running Server Diagnostics Mac OS X in host mode. If a computer on the same subnet is running Server Diagnostics Mac OS X tools in host mode, the server automatically enters client mode.

To test the local server using Server Diagnostics EFI:

- Restart the server and hold down the Option or F1 key (or use the Xserve front panel buttons) to start up the volume or NetBoot disk image with Server Diagnostics EFI.

For information about how to temporarily change the startup volume while starting the computer, see Chapter 3, "Starting Up Server Diagnostics," on page 21.

When Server Diagnostics EFI starts up and doesn't find a host computer, it enters local mode.

Testing the Local Server Using Server Diagnostics Mac OS X

To test the local server, you must log in as root. If you don't log in as root, Server Diagnostics Mac OS X automatically enters host mode.

To test the local server using Server Diagnostics Mac OS X:

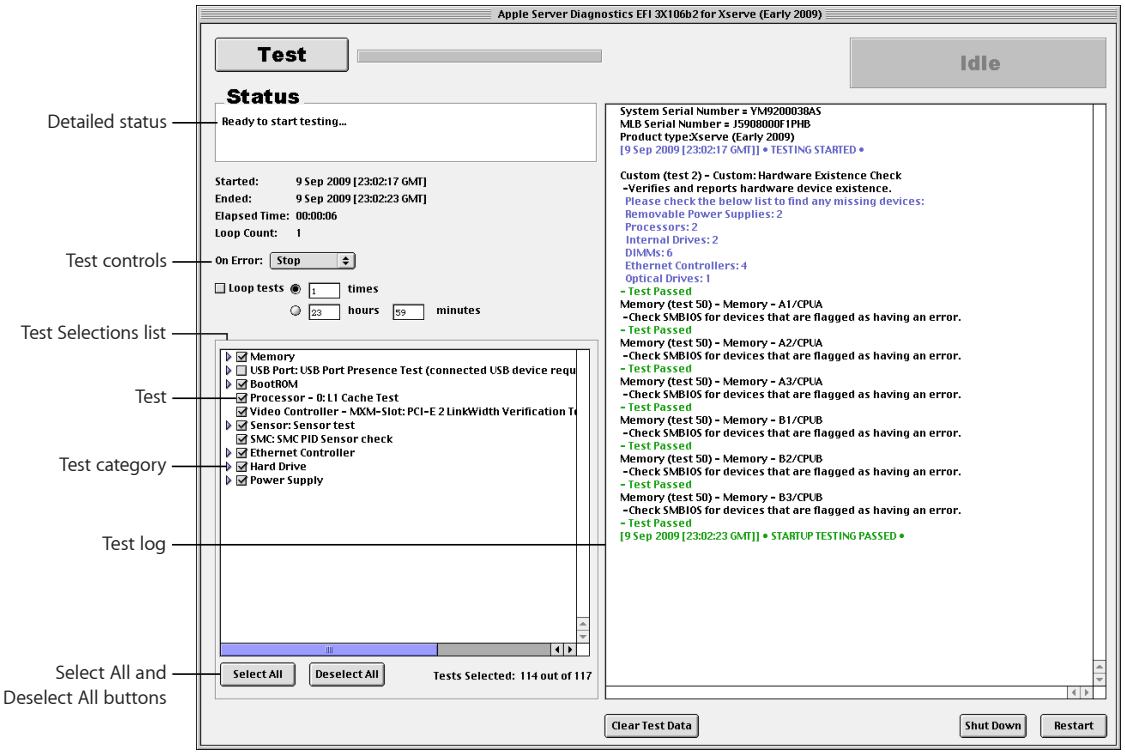
1. Change the startup disk of the server to a volume with Server Diagnostics Mac OS X, restart it, and log in as root.
2. If Server Diagnostics Mac OS X doesn't open automatically, open it (typically located in /Applications/).
3. When Server Diagnostics Mac OS X opens, choose "Local" from the dialog that appears and click OK.

Using Server Diagnostics EFI

In Server Diagnostics EFI, the test controls and test selections are split across two panes. Regardless of which pane you're looking at, you can do the following:

- View the test log, test settings, and status
- Start tests
- Clear the test log
- Restart the server

- Shut down the server


Apple Server Diagnostics EFI 3X106b2 for Xserve (Early 2009)
Test
Idle
Status
Detailed status
Ready to start testing...
Started: 9 Sep 2009 [23:02:17 GMT]
Ended: 9 Sep 2009 [23:02:23 GMT]
Elapsed Time: 00:00:06
Loop Count: 1
Test controls
On Error: Stop
Loop tests 1 times
23 hours 59 minutes
Test Selections list
Memory
USB Port: USB Port Presence Test (connected USB device requ
BootROM
Test
Processor - 0: L1 Cache Test
Video Controller - MXM-Slot: PCI-E 2 LinkWidth Verification T
Sensor: Sensor test
SMC: SMC PID Sensor check
Test category
Ethernet Controller
Hard Drive
Power Supply
Test log
Select All and Deselect All buttons
Select All
Deselect All
Tests Selected: 114 out of 117
System Serial Number = YM9200038AS
MLB Serial Number = J5908000F1PHB
Product type:Xserve (Early 2009)
[9 Sep 2009 [23:02:17 GMT]] • TESTING STARTED •
Custom (test 2) - Custom: Hardware Existence Check
-Verifies and reports hardware device existence.
Please check the below list to find any missing devices:
Removable Power Supplies: 2
Processors: 2
Internal Drives: 2
DIMMs: 6
Ethernet Controllers: 4
Optical Drives: 1
- Test Passed
Memory (test 50) - Memory - A1/CPUA
-Check SMBIOS for devices that are flagged as having an error.
- Test Passed
Memory (test 50) - Memory - A2/CPUA
-Check SMBIOS for devices that are flagged as having an error.
- Test Passed
Memory (test 50) - Memory - A3/CPUA
-Check SMBIOS for devices that are flagged as having an error.
- Test Passed
Memory (test 50) - Memory - B1/CPUB
-Check SMBIOS for devices that are flagged as having an error.
- Test Passed
Memory (test 50) - Memory - B2/CPUB
-Check SMBIOS for devices that are flagged as having an error.
- Test Passed
Memory (test 50) - Memory - B3/CPUB
-Check SMBIOS for devices that are flagged as having an error.
- Test Passed
[9 Sep 2009 [23:02:23 GMT]] • STARTUP TESTING PASSED •
Clear Test Data
Shut Down
Restart

For more information about Server Diagnostics EFI, see the following sections.

Customizing Server Diagnostics EFI Test Settings

You can customize Server Diagnostics test settings by choosing which tests are run, whether to loop tests, and whether to stop or continue testing when an error occurs.

To customize Server Diagnostics EFI test settings:

1. In Server Diagnostics EFI, select the test settings you want.

To do this	Do this
Choose which tests are run	Do any of the following: • To select a test, select the checkbox next to the test. • To select a specific test within a category of tests, click the disclosure triangle next to the category, and then select individual tests. • To select all tests, click Select All. • To remove all tests, click Deselect All.
Loop all selected tests	Do one of the following: • To loop all selected tests a specific number of times, select "Loop # times" and replace # with the number of times to loop. • To run all tests once, select "Loop # times" and replace # with the number 1. • To loop all tests for a specific amount of time, select "Loop for # hours and # minutes" and replace # with number of hours and minutes to loop. When the specified time is reached, the current loop must complete before the tests stop. For example, if one loop of your test set takes 2 hours to complete and your specified time is 3 hours, Server Diagnostics stops testing in 4 hours. (Instead of stopping at 3, it waits for the current test set loop to complete before stopping.)
Change what to do when an error occurs	In the On Error pop-up menu, do one of the following: • To stop testing when the first error occurs, choose Stop. • To continue testing when errors occur, choose Continue.

2 To run the test, click Test.

Clearing the Test Log

The test log contains all test messages that have occurred during the current Server Diagnostics session. If you quit Server Diagnostics, the log is cleared.

To clear the test log without quitting Server Diagnostics, click Clear Test Data.

Viewing the Hardware Profile

The hardware profile lists all hardware components in the server.

You can view the hardware profile by choosing Hardware Profile > Display Hardware Profile.

Shutting Down or Restarting the Server

You can shut down or restart the server in Server Diagnostics EFI.

To shut down or restart the server:

- Click Shut Down or Restart.

Viewing Saved Logs

When you start up Server Diagnostics EFI from a volume in MS-DOS (FAT) format, it automatically creates a log of its test results in the /AppleServerDiagnosticsLogs/ folder of the volume with Server Diagnostics EFI installed. This log is continually updated as tests complete. If the server crashes during tests, you can review the log to see which test it crashed on.

If you run the preinstalled Server Diagnostics EFI or Server Diagnostics EFI from the *Admin Tools* disc, a NetBoot disc image, or a volume that isn't in MS-DOS (FAT) format, logs aren't saved.

The logs are named AppleServerDiagnostics_*date*_*time*_*serialnumber*.txt.

The *date* and *time* indicate when Server Diagnostics EFI started up. The time is in Greenwich Mean Time (GMT), using a 24-hour format.

The values use this format:

Value	Format	Example
date	DDMonYear	15Jul2009
time	HH_MM_SS	19_23_46
serialnumber	###########	AB12345CD6E

Taking Screenshots

You can take screenshots of Server Diagnostics EFI, which are saved as BMP files in the root folder of the volume with Server Diagnostics EFI installed.

If you run Server Diagnostics EFI from the *Admin Tools* disc, a NetBoot disc image, or =a volume that isn't in MS-DOS (FAT) format, you can't take screenshots.

To take a screenshot:

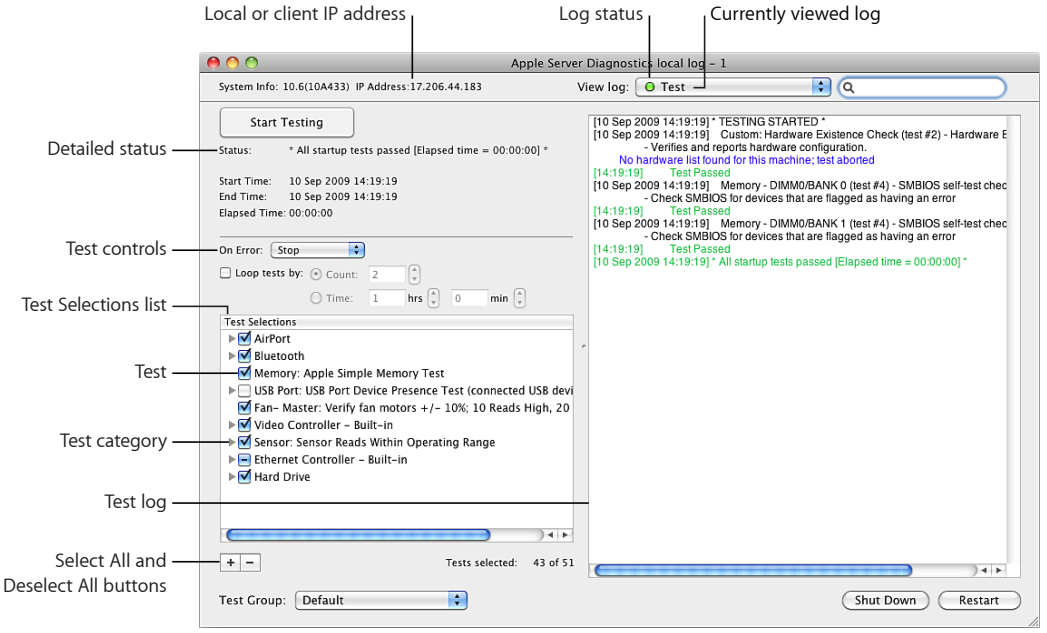
- In Server Diagnostics EFI, press Command-Shift-3.

  After you press Command-Shift-3, the system pauses for a few seconds and then takes the screenshot.

Using Server Diagnostics Mac OS X

Server Diagnostics Mac OS X changes based on whether you're running it locally, as a client, or as a host. In client mode, you can't change test settings, select different tests, or shut down or restart the server. Therefore, the test log uses most of the window.

In local and host mode, you can access all Server Diagnostics Mac OS X features in the main window.


Local or client IP address
Log status
Currently viewed log
Apple Server Diagnostics local log – 1
System Info: 10.6(10A433) IP Address:17.206.44.183
View log: Test
Start Testing
Detailed status
Status: * All startup tests passed [Elapsed time = 00:00:00] *
Start Time: 10 Sep 2009 14:19:19
End Time: 10 Sep 2009 14:19:19
Elapsed Time: 00:00:00
Test controls
On Error: Stop
Loop tests by: Count: 2
Time: 1 hrs 0 min
Test Selections list
Test Selections
AirPort
Bluetooth
Test
Memory: Apple Simple Memory Test
USB Port: USB Port Device Presence Test (connected USB devi
Fan– Master: Verify fan motors +/– 10%; 10 Reads High, 20
Video Controller – Built–in
Test category
Sensor: Sensor Reads Within Operating Range
Ethernet Controller – Built–in
Hard Drive
Test log
[10 Sep 2009 14:19:19] * TESTING STARTED *
[10 Sep 2009 14:19:19] Custom: Hardware Existence Check (test #2) - Hardware E
- Verifies and reports hardware configuration.
No hardware list found for this machine; test aborted
[14:19:19] Test Passed
[10 Sep 2009 14:19:19] Memory - DIMM0/BANK 0 (test #4) - SMBIOS self-test chec
- Check SMBIOS for devices that are flagged as having an error
[14:19:19] Test Passed
[10 Sep 2009 14:19:19] Memory - DIMM0/BANK 1 (test #4) - SMBIOS self-test chec
- Check SMBIOS for devices that are flagged as having an error
[14:19:19] Test Passed
[10 Sep 2009 14:19:19] * All startup tests passed [Elapsed time = 00:00:00] *
Select All and Deselect All buttons
Tests selected: 43 of 51
Test Group: Default
Shut Down
Restart

For more information about using Server Diagnostics Mac OS X, see the following sections.

Customizing Server Diagnostics Mac OS X Test Settings

You can customize Server Diagnostics test settings in several ways by choosing which tests are run, whether to loop tests, and whether to stop or continue testing when an error occurs.

To customize Server Diagnostics Mac OS X test settings:

1. In Server Diagnostics Mac OS X, select the test settings you want.

To do this	Do this
Choose which tests are run	In the Test Selections list, do the following: • To select a test, select the checkbox next to the test. • To select a specific test within a category of tests, click the disclosure triangle next to the category, and then select individual tests. • To select all tests, click the Select All (+) button. • To remove all tests, click the Deselect All (–) button.
Loop all selected tests	Select "Loop tests by," and then do the following: • To loop all selected tests a specific number of times, select Count and enter a number of times to loop. • To loop all selected tests for a specific amount of time, select Time and enter the number of hours and minutes to loop. When the specified time is reached, the current loop must complete before the tests stop. For example, if one loop of your test set takes 2 hours to complete and your specified time is 3 hours, Server Diagnostics Mac OS X stops testing in 4 hours. (Instead of stopping at 3, it waits for the current test set loop to complete before stopping.)
Change what to do when an error occurs	In the On Error pop-up menu, do the following: • To stop testing when the first error occurs, choose Stop. • To continue testing when errors occur, choose Continue.

2 To save your customized test settings for future use, in the Test Group pop-up menu, choose Save Current Group. Enter a name for the group and click OK.

For more information, see the next section, "Working with Test Groups."

3 To run the test, click Start Testing.

4 When the test completes, a PASSED or FAILED message appears on screen. Click anywhere to close the message.

Working with Test Groups

You can create test groups based on your customized test settings. These are similar to templates because they allow you to reuse your test settings without having to change each setting individually. After choosing a test group, you can still change its settings.

There are several test groups included with Server Diagnostics Mac OS X. These test groups stop when an error occurs, and they aren't looped.

Test group	Test selections
Default	All memory, fan, hard drive, sensor, SMC PID sensor, and power supply tests. Ethernet MAC address verification and ROM checksum verification.
Quick Test	All sensor tests.

You can also export a test group to a file. By exporting a test group, you can use that file to re-create that test group on other Server Diagnostics installations. For example, if you install Server Diagnostics Mac OS X on several servers, you can copy the test group file to each of them, making identical tests available without having to manually create a new test group.

To work with test groups:

- In Server Diagnostics Mac OS X, choose the options you want.

To do this	Do this
Use a test group	In the Test Group pop-up menu, choose a test group.
Create a new test group	In the Test Group pop-up menu, choose Save Current Group. Enter a name for the group and click OK.
Delete a test group	In the Test Group pop-up menu, choose a test group. Choose Edit > Delete Test Group. You can't delete the Default or Quick Test test groups.
Export a test group	Choose File > Export Test Group, choose a location, name the test group, and click Save.
Import a test group	Choose File > Open, select an .axdconfig file, and click Open.

Viewing Logs

You can view the following types of logs in Server Diagnostics Mac OS X:

Log type	Description
Test	All messages from tests run in the current Server Diagnostics Mac OS X session.
Hardware Info	Listing and description of all installed hardware.

When you view logs in Server Diagnostics Mac OS X, a colored circle next to the log name indicates whether the log is able to be loaded.

Color	Status
No circle	You haven't loaded the log during this Server Diagnostics session, or the log hasn't been created yet.
Yellow	The log didn't load. This usually occurs when there isn't any data in the log.
Green	The log loaded.

To view logs:

1. Open Server Diagnostics Mac OS X.
2. If tests are currently running, wait for them to complete or stop them.

   If tests are running, you can view only the test log.
3. Do any the following:

To do this	Do this
View logs in the current or chosen volume	Choose a log from the "View log" pop-up menu.
Search for specific text within the log	Enter text in the search field. When you press Return, matching text is highlighted in the log area.
Clear logs	Choose Logs > Clear *current* Log, or choose Logs > Clear All Logs. The name of the currently viewed log replaces *current*.
Refresh logs	Choose Logs > Refresh Current Log.

Setting Log Preferences

You can set up log preferences so that the Server Diagnostics test logs are automatically saved to a file at a location you choose. Server Diagnostics test logs are created every time you start a new Server Diagnostics session.

When Server Diagnostics Mac OS X saves a log, it overwrites any existing log of the same name. Log preferences can automatically customize the name of the log file so that the log files aren't overwritten.

If you don't use any of the naming options, the log is saved as:

AppleServerDiagnostics_*serialnumber*_*mode*_autosave_log.txt

If you're testing locally, *mode* is replaced by "local." If you're testing remotely, *mode* is replaced by "remote."

If you use all of the naming options, the log is saved as:

AppleServerDiagnostics_*serialnumber*_*mode*_autosave_log_*date*_*ethernetMACaddress* *uniquename*.txt

The appended values use this format:

Value	Format	Example
date	DD_Mon_Year	15_Jul_2009
ethernetMACaddress	##_##_##_##_##_##	01_23_45_67_89_ab
uniquename	- #	- 1

The unique name is appended only if a file with the same name exists.

A log for the local server with all naming options enabled (using the example values) is saved as:

AppleServerDiagnostics_AB12345CD6E_local_autosave_log_15_Jul_2009_01_23_45_67_89_ab - 1.txt

To set log preferences:

1. In Server Diagnostics Mac OS X, choose AppleServerDiagnostics > Preferences.
2. To automatically save test logs, select "Auto-save test log."

   If you don't select this option, you can't perform the steps that follow.
3. To choose the location of the automatically saved log, click "Choose auto-save location," select a location, and then click Open.
4. Configure the test log naming options.

To do this	Do this
Ensure newly created log files don't overwrite old log files	Select "Use unique name."
Append the Ethernet address of the server that's being tested	Select "Append Ethernet Address."
Append the run time and date of the session's first tests	Select "Append time and date."

Shutting Down or Restarting the Server

If you're running Server Diagnostics Mac OS X on the local server or on a host computer, you can shut down or restart the server by clicking Shut Down or Restart.

If the server is in client mode, you can't shut down or restart the server locally.

Quitting Server Diagnostics Mac OS X While a Test is Running

If you try to quit Server Diagnostics Mac OS X while a test is running, you won't be able to print or save any logs from the current Server Diagnostics session. Make sure you print or save any critical logs before quitting.

Instead of quitting in the middle of a test, you can stop the current test, print or save logs, and then quit.

Server Diagnostics Test Reference

This reference describes all the tests available in Server Diagnostics and gives estimates for how long the tests take to complete.

The types of tests available depend on if you're using Server Diagnostics EFI or Server Diagnostics Mac OS X, and on your server model and configuration.

Comparison of Available Tests

The following table compares the tests available by component, depending on if you're using Server Diagnostics EFI or Server Diagnostics Mac OS X. For more information about the specific tests available for each component, see "Server Diagnostics EFI Tests" on page 44 and "Server Diagnostics Mac OS X Tests" on page 50.

Depending on your server hardware, some of these tests might be unavailable. If they're unavailable, the component doesn't appear in Server Diagnostics.

A ✓ indicates that a test is available, and a blank entry indicates that there are no tests available:

Component tested	Available in Server Diagnostics EFI	Available in Server Diagnostics Mac OS X	Notes
AirPort	✓	✓	Different tests are available depending on the tool.
Bluetooth		✓	
Boot ROM	✓		

Component tested	Available in Server Diagnostics EFI	Available in Server Diagnostics Mac OS X	Notes
Ethernet controller	✓	✓	Different tests are available depending on the tool.
Fan		✓	
Hard drive	✓	✓	Different tests are available depending on the tool.
Memory (simple)	✓	✓	In Server Diagnostics EFI, this tests only the first 2.5 GB of memory using a single CPU core. In Server Diagnostics Mac OS X, this tests all memory using a single CPU core.
Memory (multicore)	✓	✓	In Server Diagnostics EFI, this tests the first 2.5 GB of memory using all available CPU cores. In Server Diagnostics Mac OS X, this tests all memory using all available CPU cores.
Memory (extended)	✓		Tests all memory.
Power supply	✓	✓	Tests removable power supplies.
Processor	✓		
Sensor	✓	✓	Server Diagnostics Mac OS X has an additional sensor test.
SMC PID sensor	✓		
USB port	✓	✓	
Video controller	✓	✓	Server Diagnostics Mac OS X has more tests than Server Diagnostics EFI.

Server Diagnostics EFI Tests

These tests are available if your server is running Server Diagnostics EFI.

Startup Tests

These tests run automatically when you start up Server Diagnostics EFI.

SMBIOS tests check to see if bad memory was detected and mapped out at server startup. When the server tests memory at startup, it automatically maps out bad memory. Mac OS X doesn't see this mapped-out memory, so the non-SMBIOS memory tests don't test it. The SMBIOS test reports these mapped-out DIMMS.

When an ECC error occurs, memory catches the problem and and fixes it. When you run other memory tests, the tests don't realize an error has occurred. The ECC tests detect these memory fixes and report them.

Test	Estimated completion time	Description
Hardware Existence	1 second	Compares a table of sensors and fans with what's connected to the logic board. If a sensor or fan isn't found, an error occurs. All sensors found can be individually tested using sensor tests.
SMBIOS Self-Test	1 second	Checks the SMBIOS tables for 32-bit errors (type 18) and 64-bit errors (type 33). Also verifies that the mapped-in DIMM size is appropriate for the slot it's inserted into. If there's a size mismatch, an error occurs.
ECC Error Count	1 second	Reports the number of ECC errors, and then resets the count.

AirPort Tests

Test	Estimated completion time	Description
PCI-E LinkWidth Verification	1 second	Verifies PCI link width is as expected.

Boot ROM Tests

Test	Estimated completion time	Description
Boot ROM Checksum	1 second	Verifies the Boot ROM checksum.
Boot ROM FW GUID MAC Addr Checksum	1 second	Verifies the Boot ROM FireWire GUID MAC address checksum.

Ethernet Controller Tests

The availability of Ethernet controller tests depends on the Enternet controller installed in the server.

Test	Estimated completion time	Description
MAC Address Verification	1 second	Verifies MAC address isn't all FFs or 00s.
PCI-E 1 LinkWidth Verification	1 second	Verifies PCI link width is 1.
PCI-E 2 LinkWidth Verification	1 second	Verifies PCI link width is 2.
PCI-E 4 LinkWidth Verification	1 second	Verifies PCI link width is 4.
PCI-E 2.5G Link Speed Verification	1 second	Verifies PCI link speed is 2.5G.

Hard Drive Tests

When Server Diagnostics EFI starts, it performs a hardware existence test. All hard drives found during this test can be tested individually using hard drive tests.

Test	Estimated completion time	Description
Full Read	2 hours for an 500 GB drive; 3 hours for a 1 TB drive	Performs a DMA full-read scan at 1250 RPM. This checks the entire hard drive for slow-read failures.
Abbreviated Read	2 minutes	Performs a DMA scan at 1250 RPM. This checks the first 10 GB of the hard drive for slow-read failures.

Memory Tests

All memory tests are listed under Memory. These tests are described here.

An ECC error count test is automatically run after these tests complete.

Simple Memory Tests

Simple memory tests test the first 2.5 GB of memory. To test all memory, run extended memory tests.

Even though simple memory tests don't test all memory, you can run these tests to detect intermittent memory issues.

In Server Diagnostics EFI, all memory tests (simple, multicore, and extended) are grouped under Memory tests.

Note: The time required to complete memory tests correlates to the amount of memory being tested. These estimates are based on testing 2 GB of memory.

Test	Estimated completion time	Description
Address as Data	5 seconds	Tests memory using the memory address as data.
Patterns	10 seconds	Tests memory using different data patterns.
Marching Ones and Zeros	10 seconds	Tests memory by walking 1s and 0s up and down memory.
Knaizuk Hartmann	5 seconds	Tests memory using this algorithm.
MOD3	15 seconds	Tests memory using this algorithm.
March U	1 minute	Tests memory using Van de Goor's March U algorithm.
Random	15 seconds	Uses pseudo-random values.
Block Checkerboard 32	5 seconds	Alternates 32-bit words with all 1s and all 0s, and then with all 0s and all 1s.
Bit Checkerboard 32	5 seconds	Alternates bits with all 1s and all 0s, and then with all 0s and all 1s.
Sequential Byte Block 32	9 minutes	Fills all bytes sequentially with patterns starting at 0x00 and ending at 0xFF.
Walking One 32	5 minutes	Walks 1s up and down memory.
Walking Zero 32	5 minutes	Walks 0s up and down memory.
Walking Spread Bit 32	5 minutes	Walks 0b01 up and then walks 0b10 down memory.
Walking Bit Flip 32	5 minutes	Alternates words with walking 1 and walking 0, and then alternates with walking 0 and walking 1.

Multicore Memory Tests

Multicore memory tests test the first 2.5 GB of memory using all available CPU cores.

In Server Diagnostics EFI, all memory tests (simple, multicore, and extended) are grouped under Memory tests.

Note: The time required to complete memory tests correlates to the amount of memory being tested. These estimates are based on testing 1 GB of memory.

Test	Estimated completion time	Description
MP Block Checkerboard	5 seconds	Alternates 32-bit words with all 1s and all 0s, and then with all 0s and all 1s.
MP Bit Checkerboard	5 seconds	Alternates bits with all 1s and all 0s, and then with all 0s and all 1s.
MP Sequential Byte Block	8 minutes	Fills all bytes sequentially with patterns starting at 0x00 and ending at 0xFF.
MP Walking One	2 minutes	Walks 1s up and down memory.
MP Walking Zero	4 minutes	Walks 0s up and down memory.
MP Walking Spread Bit	4 minutes	Walks 0b01 up and then walks 0b10 down memory.
MP Walking Bit Flip	4 minutes	Alternates words with walking 1 and walking 0, and then alternates words with walking 0 and walking 1.
Check Hardware Errors	1 second	Tests specific registers for memory related errors. Running this test at the end of memory testing may help catch memory errors generated during other memory tests.

Extended Memory Tests

Extended memory tests test all available memory.

In Server Diagnostics EFI, all memory tests (simple, multicore, and extended) are grouped under Memory tests.

The availability of extended memory tests depends on the server model you test.

Note: The time required to complete memory tests correlates to the amount of memory being tested. These estimates are based on testing 1 GB of memory.

Test	Estimated completion time	Description
Extended Memory Test P00F	5 seconds	Tests memory using pattern 0. This fails if an error occurs.
Extended Memory Test P01F	5 seconds	Tests memory using pattern 1. This fails if an error occurs.
Extended Memory Test P02F	5 seconds	Tests memory using pattern 2. This fails if an error occurs.
Extended Memory Test P03F	5 seconds	Tests memory using pattern 3. This fails if an error occurs.
Extended Memory Test P04F	5 seconds	Tests memory using pattern 4. This fails if an error occurs.
Extended Memory Test P05F	5 seconds	Tests memory using pattern 5. This fails if an error occurs.
Extended Memory Test P06F	5 seconds	Tests memory using pattern 6. This fails if an error occurs.
Extended Memory Test P07F	5 seconds	Tests memory using pattern 7. This fails if an error occurs.

Power Supply Tests

Test	Estimated completion time	Description
Good	1 second	Checks if the power supply's good bit is set. If it's not set, this could indicate that the power supply isn't seated well or is bad, or that there's no AC connected.
Quick	5 seconds	This is available only if you have more than one power supply. This turns off the redundant power supplies so that only one power supply is used.

Processor Tests

Test	Estimated completion time	Description
L1 Cache Test	2 seconds	Verifies that the L1 cache is good on all processor cores.

Sensor Tests

When Server Diagnostics EFI starts, it performs a hardware existence test. All sensors found during this test can be tested individually using sensor tests.

Test	Estimated completion time	Description
Sensor Reads	1 second	Verifies that the sensor reads are within the preset sensor limits.

SMC PID Sensor Tests

The System Management Controller (SMC) monitors the Proportional Integral Derivative (PID) controller which controls several important temperature sensors.

Test	Estimated completion time	Description
SMC PID Sensor	1 second	Verifies that the sensor reads controlled by the PID are within the preset sensor limits.

USB Tests

Connect USB devices before running USB tests.

Test	Estimated completion time	Description
Presence	1 second	Verifies that a USB device is connected.

Video Controller Tests

The availability of video controller tests depends on the video controller installed in the server.

Test	Estimated completion time	Description
PCI-E 8 LinkWidth Verification	1 second	Verifies PCI link width is 8.
Framebuffer Address as Data	2 minutes	Tests the framebuffer using framebuffer addresses as data.

Server Diagnostics Mac OS X Tests

These tests are available if your server is running Server Diagnostics Mac OS X.

Startup Tests

These tests run automatically when you start up Server Diagnostics Mac OS X.

SMBIOS tests check to see if bad memory was detected and mapped out at server startup. When the server tests memory at start up, it automatically maps out bad memory. Mac OS X doesn't see this mapped out memory, so the non-SMBIOS memory tests don't test it. The SMBIOS test reports these mapped out DIMMS.

When an ECC error occurs, memory catches the problem and and fixes it. When you run other memory tests, the tests don't realize an error has occurred. The ECC tests detect these memory fixes and report them.

Test	Estimated completion time	Description
Hardware Existence	1 second	Compares a table of sensors and fans with what's connected to the logic board. If a sensor or fan isn't found, an error occurs. All sensors, fans, and hard drives found can be individually tested using sensor, fan, hard drive tests.
SMBIOS Self-Test	1 second	Checks the SMBIOS tables for 32-bit errors (type 18) and 64-bit errors (type 33). Also verifies that the mapped-in DIMM size is appropriate for the slot it's inserted into. If there's a size mismatch, an error occurs.
ECC Error Count	1 second	Reports the number of ECC errors, and then resets the count.

AirPort Tests

Test	Estimated completion time	Description
AirPort MAC Address Verification	1 second	Verifies MAC address isn't all FFs or 00s.
AirPort Power Cycle	10 seconds	Verifies AirPort by performing a wireless scan after turning AirPort power off, then turning AirPort power on.

Bluetooth Tests

Test	Estimated completion time	Description
Bluetooth USB Interface	2 seconds	Verifies USB interface between host and Bluetooth.
MAC Address Verification	2 seconds	Verifies MAC address isn't all FFs or 00s.
Bluetooth Power Cycle	10 seconds	Verifies USB interface between host and Bluetooth after turning Bluetooth power off, and then turning Bluetooth power on.

Ethernet Controller Tests

The availability of Ethernet controller tests depends on the Enternet controller installed in the server.

Data loop tests can add to network traffic. Consider disconnecting from the network before running the data loop tests.

Test	Estimated completion time	Description
MAC Address Verification	1 second	Verifies MAC address isn't all FFs or 00s.
MAC Loopback	1 minute	Verifies that there's no data mismatch between sent and received data while looping within the MAC (a sublayer of the datalink layer in the ISO network reference model).
PHY 1000 Loopback	20 seconds per port, 40 seconds total	Verifies that there's no data mismatch between sent and received data while looping within the physical transport medium (PHY) at 1000 Mbps.
PHY Jumbo Packet Loopback	25 seconds per port, 50 seconds total	Verifies that there's no data mismatch between sent and received jumbo packet data while looping within the physical transport medium (PHY) at the the highest supported speed.

Fan Tests

When Server Diagnostics Mac OS X starts, it performs a hardware existence test. All fans found during this test can be tested individually using fan tests.

Test	Estimated completion time	Description
Verify Motor +/– 10%, 10 Reads High, 20 Low	2 minutes	Verifies the minimum and maximum fan speeds. Sets the minimum and maximum builds within 10% of the threshold and then does 10 consecutive reads at the maximum and 20 at the minimum.
Verify Motor Automatically +/– 15%	2 minutes	Verifies the minimum and maximum fan speeds. Sets the minimum and maximum builds within 15% of the threshold.

Hard Drive Tests

When Server Diagnostics Mac OS X starts, it performs a hardware existence test. All hard drives and solid-state drives found during this test can be tested individually using hard drive tests.

Test	Estimated completion time	Description
Threaded Surface Scan	2 hours for an 500 GB drive; 3 hours for a 1 TB drive	Scans the entire surface of a hard drive.
Threaded Surface Short Scan	3 minutes	Scans the first 10 GB of a hard drive.
Check SMART Status	1 second	Checks the SMART status of a hard drive.
Short Random Multi-block	7 minutes	Performs a threaded, random multi-block read of random ranges of the target hard drive. This isn't a full surface scan, but it causes rapid seeking and reading of hard drive blocks. If a block can't be read, an error occurs.

Memory Tests

All memory tests are categorized here.

Simple Memory Tests

Server Diagnostics Mac OS X memory tests test the first 2.5 GB of memory. All multicore memory tests listed in Server Diagnostics EFI are run.

Even though these tests don't test all memory, run these tests to detect intermittent memory issues.

After the first 2.5 GB of memory is tested, the memory test then tests for ECC errors. When an ECC error occurs, memory catches the problem and fixes it. The test detects the number of memory fixes and reports them.

Note: The time required to complete memory tests correlates to the size of memory being tested. These estimates are based on testing 1 GB of memory.

Test	Estimated completion time	Description
Simple Test	17 minutes	Runs all multicore memory tests listed in Server Diagnostics EFI, reports the number of ECC errors, and then resets the count.

Power Supply Tests

Test	Estimated completion time	Description
Good	1 second	Checks if the power supply's good bit is set. If it's not set, this could indicate that the power supply isn't seated well or is bad, or that there's no AC connected.
Quick	5 seconds	This is available only if you have more than one power supply. This turns off the redundant power supplies so that only one is run on.

Sensor Tests

When Server Diagnostics Mac OS X starts, it performs a hardware existence test. All sensors found during this test can be tested individually using sensor tests.

Test	Estimated completion time	Description
Sensor Reads	1 second	Verifies that the sensor reads are within the preset sensor limits.

USB Tests

Connect USB devices before running USB tests.

Test	Estimated completion time	Description
Presence	1 second	Verifies that a USB device is connected.

Video Controller Tests

To run these tests, a display must be attached to any graphics cards being tested. The displays can't be in sleep. For example, if you have two graphics cards, they both need a display attached and both displays must not be in sleep.

Test	Estimated completion time	Description
OpenGL Point	10 seconds	Verifies video controller using a 2D point test.
OpenGL Line	10 seconds	Verifies video controller using a 2D line test.
OpenGL Triangle	10 seconds	Verifies video controller using a 2D triangle test.
OpenGL Quad	10 seconds	Verifies video controller using a 2D quadrilateral test.
OpenGL Quad with Texture	10 seconds	Verifies video controller using a 2D textured quadrilateral test.
OpenGL Rectangle	10 seconds	Verifies video controller using a 2D rectangle test.
OpenGL Cube	10 seconds	Verifies video controller using a 3D cube test.
OpenGL Cube with Fog	10 seconds	Verifies video controller using a 3D cube with fog test.
OpenGL Wireframe	10 seconds	Verifies video controller using a 3D wireframe test.
OpenGL Solid Red Model	10 seconds	Verifies video controller using a 3D solid red model test.
OpenGL Solid Red Model with Fog	10 seconds	Verifies video controller using a 3D solid red model with fog test.
Fragment Instruction	2 minutes	Tests every instruction of the ARB fragment program.
Vertex Instruction	1 minute	Tests every instruction of the ARB vertex program.